16. self heating resistance

17. self heating resistance

18. vacant

19. screen

20. protection layer

21. chip base

22. self heating module

Claims

1. A flow sensor, which includes at least one chip base and resistance grown on it and coupler, the chip is 2500X2500(micrometer)^2, resistance valued from 1 to 1000 ohm and wire width of 5 to 100 micrometer.

2. The flow sensor of claim 1, wherein there is a deposited layer between the resistance and the chip base.

3. The flow sensor of claim 1, wherein the resistance contains noble metal, polycrystalline silicon or conductive ceramic film.

4. The flow sensor of claim 3, wherein the resistance contains noble

metal.

5. The flow sensor of claim 4, wherein the resistance contains platinum.

6. The flow sensor of claim 1, wherein the resistance film is over 1000-angstrom.

7. The flow sensor of claim 1, wherein the resistance is made in repeated way.

8. The flow sensor of claim 1, wherein the chip base is of glass, silicon or ceramic materials.

9. The flow sensor of claim 8, wherein the chip base is processed by etching to reduce heat capacity.

10. The flow sensor of claim 9, wherein the etching is active ion etching or wet etching.

11. The flow sensor of claim 10, wherein the etching is by buffered hydrofluoric acid.

12. The flow sensor of claim 1, wherein the chip base has a single resistance to form a single direction sensor module.

13. The flow sensor of claim 1, wherein the chip base has multi resistances to form bi-directional sensor module.

14. The flow sensor of claim 1, wherein the resistance has a protection layer.

15. The flow sensor of claim 14, wherein the protection layer is silica.

16. The flow sensor of claim 15, wherein the connection pad material is common conductive metal.

17. The flow sensor of claim 16, wherein the connection pad material includes copper, aluminum or other alloy.

sub A1 > 18. The flow sensor of claim 12 or 13, wherein the model is desktop or portable type.

19. The flow sensor of claim 2, wherein the adhesion layer includes chromium or titanium.

20. A method of making of the flow sensor, which contains at least:

(a) Treatment of a chip base;

(b)surface micromaching process, which will include at least:

(1) procedure to grow a metal layer on top of the chip base;

(2) etching out the attached metal layer which has grown outside the resistance pattern;

(c)step to bulk micromaching the chip base;

(d)step to make the connection pad for the resistance.

21. The method of claim 20, wherein step (b) and (c) may change sequence.

22. The method of claim 20, wherein the step (b)-(2) is wet etching.

23. The method of claim 20, wherein a alloy of the attached layer and the growing layer may be prepared on the chip base or by sequential preparation.

24. The method of claim 20, wherein the protection layer may be prepared before or after step (d).

25.The method of claim 24, wherein the protection layer is prepared by chemical deposit or metal evaporation.

26.The method of claim 20, wherein the chip base is glass, silicon or ceramic materials.

27. The method of claim 20, wherein there is a step of making a isolation layer.

28.The method of claim 27, wherein the isolation layer is silica.

29.The method of claim 23, wherein the growing layer is made by chemical deposit or evaporation onto the chip base.

30.The method of claim 20, wherein the etching of chip base is wet etching or active ion etching.

31. The method of claim 30, wherein the wet etching agent is buffered hydrofluoric acid

32. The method of claim 20, wherein step (b)-(2) is taken to etch out the attached or growing metal layer outside the resistance pattern to form the

resistive layer.

33. The method of claim 32, wherein the resistance has a wire width not less than 5 micrometer.

34. The method of claim 33, wherein the resistance is 1 to 1000-ohm.

35. The method of claim 20, wherein the growing layer contains noble metal, polycrystalline silicon or conductive ceramic film.

36.The method of claim 25, wherein the growing layer contains noble metal.

37. The method of claim 36, wherein the growing metal contains platinum.

38. The method of claim 29, wherein the growing or evaporated or deposited film is 50 to 600 angstrom.

39. The method of claim 29, wherein the growing or evaporated or deposited film is 1000-angstrom.

40. The method of claim 20, wherein the resistance pattern is repeated form on the chip base.

41.The method of claim 40, wherein the resistance pattern for single or multi design is based on the single direction or bi-directional flow measurement requirement.

42. The method of claim 24, wherein the protection layer contains silica.

43. The method of claim 20, wherein the connection pads material may be common conductive metal.

44.The method of claim 43, wherein the connection pads material contains copper, aluminum or the alloy.

45. The method of claim 43, wherein the making of the connection pads is etching and splashing or etching and evaporation.

46. The method of claim 20, wherein the adhesion layer contains chromium or titanium.

47. A method of making of the hot-wire flow sensor, whichl includes at

least:

(a) Treatment of a chip base;

(b)surface micromaching process, which will include at least:

(1) step to grow or to attach a metal layer on top of the chip base, which shall be evaprated or deposited film of 50 to 600-angstrom for attached film and 1000-gngstrom for the growing film evaporated or deposited;

(2) etching out the attached metal layer which has grown outside the resistance pattern;

(c)step to bulk micromach the chip base;

(e) step to make the connection pad for the resistance;

wherein resistance is 1 to 1000-ohm..

48. The method of claim 47, wherein the sequence of (b) and (c) may change over.

49.The method of claim 47, wherein the step (b)-(2) is wet etching.

50. The method of claim 47, wherein a alloy of the attached layer and the growing layer may be prepared on the chip base or by sequential preparation.

51. The method of claim 47, wherein the protection layer may be prepared before or after step (d).

52. The method of claim 51, wherein the protection layer is prepared by chemical deposit or metal evaporation.

53. The method of claim 47, wherein the chip base is glass, silicon or ceramic material.

54. The method of claim 47, wherein there is a step of making a isolation layer after (a).

55. The method of claim 54, wherein the isolation layer is silica.

56. The method of claim 47, wherein the etching method of the chip base is wet etching or active ion etching.

57. The method of claim 56, wherein the wet etching is using buffered hydrofluoric acid

58. The method of claim 47, wherein step (b)-(2) is taken to etch out the attached or growing metal layer outside the resistance pattern to form the resistive layer.

59. The method of claim 58, wherein the resistance has a wire width not less than 5 micrometer.

60. The method of claim 47, wherein the growing layer contains noble metal, polycrystalline silicon or conductive ceramic film.

61. The method of claim 60, wherein the growing metal contains noble metal.

62. The method of claim 61, wherein the growing metal contains platinum.

63. The method of claim 47, wherein the resistance pattern is repeated form on the chip base.

64. The method of claim 63, wherein the resistance pattern for single or multi design is based on the single direction or bi-directional flow measurement requirement.

65. The method of claim 51, wherein the protection layer contains silica.

66. The method of claim 47, wherein the connection pad material may be common conductive metal.

67. The method of claim 66, wherein the connection pad material contains copper, aluminum or the alloy.

68. The method of claim 67, wherein the making of the connection pad is etching and splashing or etching and evaporation.

69. The making of claim 47, wherein the growing layer contains chromium or titanium.

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